

## CLAIMS

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An apparatus for separating components of a seed mixture, said apparatus comprising:
  - (a) a frame;
  - (b) a flat plate connected to the frame with a proximal feed end and a distal discharge end, wherein the flat plate is positioned to decline downwardly from the feed end to the discharge end so as to allow the components to be separated by rolling at different rates according to the roundness of the seeds;
  - (c) feeding means attached to the frame for feeding the components onto the feed end of the flat plate as a generally single layer of seeds to allow the seeds to roll generally independently;
  - (d) oscillating means attached to the frame for oscillating the flat plate in the plane of the plate to assist the seeds to roll.
  - (e) collection means at the discharge end of the flat plate adapted for selectively collecting, at one or more timed intervals, the components of the seed mixture such that round seeds are separated as the earliest to reach the discharge end of the plate.
2. The apparatus of claim 1, further comprising a plurality of flat plates substantially parallel and spaced apart from one another wherein the plates are staggered relative to their feed ends.
3. The apparatus of claim 2, wherein the oscillating means oscillates the flat plate in a direction generally perpendicular to the direction of rolling.
4. The apparatus of claim 3, further comprising an air cleaning system adapted to direct an air blast at the flat plate so as to clean the plate of components which did not roll.
5. The apparatus of claim 4, wherein the collection means includes a baffle to direct components into separate collection troughs based on time.
6. The apparatus of claim 5, wherein the collection means includes a gravity slide to gravity feed the components to the baffle.
7. The apparatus of claim 6, further comprising conveying means in the collection troughs to move the collected separated components into separate collection bins.

8. The apparatus of claim 7, wherein the air cleaning system comprises a fan adapted with fan baffles wherein the fan baffles gate the flow of air wherein the flow of air allows the fan to generate the air blast.
9. The apparatus of claim 8, wherein the conveying means are augers.
10. The apparatus of claim 8, wherein the means for oscillating the flat plate includes a pivoting arm articulated with the frame and a stationary base, wherein reciprocating the pivoting arm oscillates the flat plate relative to the stationary base.
11. The apparatus of claim 8, wherein the feeding means includes a first screen positioned above a second screen with smaller openings than the first, wherein both the first and second screens are mounted above the feed end of the flat plate, and wherein the first screen is adapted to receive the components from the hopper, to reciprocate relative to the second screen, and to spread the components over the area of the second screen, and the second screen is adapted to allow the components to pass through by gravity.
12. The apparatus of claim 8, wherein the feeding means includes a pivoting arm geared to a motor and attached to the first screen for reciprocating the first screen relative to the second screen.
13. The apparatus of claim 8, further comprising a return trough carried by the frame and adapted beneath the plurality of flat plates to collect components that pass through the second screen but are not fed on the feed end of the flat plates.
14. A method for separating components of a seed mixture of ripe seeds, unripe seeds, and debris, said apparatus comprising:
  - (a) providing a flat plate with a proximal feed end and a distal discharge end such that the plate declines downwardly from the feed end to the discharge end;
  - (b) feeding a single layer of components onto the feed end of the flat plate to allow the seeds to roll generally independently;
  - (c) rolling the components on the flat plate downwardly towards the discharge end wherein the seeds roll at differential rates according to the ripeness of the seeds;

(d) selectively collecting from the discharge end of the plate, at one or more timed intervals, the components of the seed mixture such that ripe seeds are separated as the earliest to reach the discharge end of the plate.

15. The method of claim 14, further comprising oscillating the flat plate in the plane of the plate to assist the ripe seeds to roll.

16. The method of claim 15, further comprising oscillating the flat plate in a direction generally perpendicular to the direction of rolling.

17. The method of claim 16, further comprising air blasting the flat plate to clean off any components which did not roll.

18. The method of claim 17, further comprising conveying separated components to separate collection bins.

19. The method of claim 14, wherein the seeds are canola.

20. The method of claim 14, wherein the seeds are mustard.